

# Review of the Type Species of *Lirobarleeia* Ponder, 1983

by

JULES HERTZ

Associate, Santa Barbara Museum of Natural History, 2559 Puesta del Sol Road,  
Santa Barbara, California 93105, USA

**Abstract.** Ponder (1983:243) designated *Alvania galapagensis* Bartsch, 1911, as the type species of the genus *Lirobarleeia* Ponder, 1983. The species figured by Ponder (1983:264, fig. 12A-D) is not *A. galapagensis* Bartsch, 1911. *Lirobarleeia galapagensis* of Ponder, 1983, is herein put in synonymy of *Lirobarleeia nigrescens* Bartsch & Rehder, 1939. *Lirobarleeia nigrescens* is compared to two similar species from Islas Galápagos, *Lirobarleeia galapagensis* (Bartsch, 1911) and *Alvinia halia* (Bartsch, 1911).

## INTRODUCTION

Ponder (1983) established the genus *Lirobarleeia* based on his study of a number of Barleeidae species. He established the type of the genus as *Alvania galapagensis* Bartsch, 1911, since his anatomical studies were conducted on what he believed to be specimens of *A. galapagensis*. Ponder (1983:264, fig. 12A-D) figured scanning electron microscope (SEM) photographs of shell, radula, operculum, and protoconch of a species identified as *Lirobarleeia galapagensis* (Bartsch). The shell, protoconch, and operculum were of a specimen from Bahía Academy, Isla Santa Cruz, Islas Galápagos (AMS C.137206, ex LACM 66-120), and the radula figured was of a specimen taken between Pta. Tomayo and Bahía Academy, Islas Galápagos (AMS C.137207, ex LACM 66-119).

While working on a large collection of micromollusks collected by Kirstie L. Kaiser on the 1988 Grupo Victoria Expedition to the Islas Galápagos, I came across a lot of specimens that appeared to be the species figured by Ponder (1983) as *Lirobarleeia galapagensis*. Ponder's figures (1983:figs. 12A, D) differ from *Alvania galapagensis* described and figured by Bartsch (1911:347-348, pl. 30, fig. 9). A scanning electron micrograph of the holotype (USNM 207590) of *A. galapagensis* is shown in Figure 1, and differs from the specimen used by Ponder for the type species of *Lirobarleeia* (shown here, with permission of the Australian Museum, as Figures 2 and 3). The question then arose as to the real identity of the specimen of *L. galapagensis* of Ponder, 1983.

## MATERIALS AND METHODS

This review is hampered by the scarcity of specimens of *Alvania galapagensis* Bartsch, 1911. In contrast, many lots

of *Lirobarleeia galapagensis* of Ponder, 1983, approximately 800 specimens, were studied. Freshly collected material studied here was collected by K. L. Kaiser in the Grupo Victoria Expedition to the Islas Galápagos. SEM photographs of uncoated specimens at 2 KV were taken of the holotypes of *A. galapagensis* Bartsch, 1911, *Alvania nigrescens* Bartsch & Rehder, 1939, and a similar looking Galapagan species, *Alvania halia* Bartsch, 1911. These high magnification photographs were used to study shell microstructure.

Institutional abbreviations are as follows: AMS, Australian Museum, Sydney; LACM, Los Angeles County Museum of Natural History; and USNM, National Museum of Natural History, Smithsonian Institution.

## SYSTEMATICS

RISSOIDEA Gray, 1847

BARLEEIDAE Gray, 1857

*Lirobarleeia* Ponder, 1983

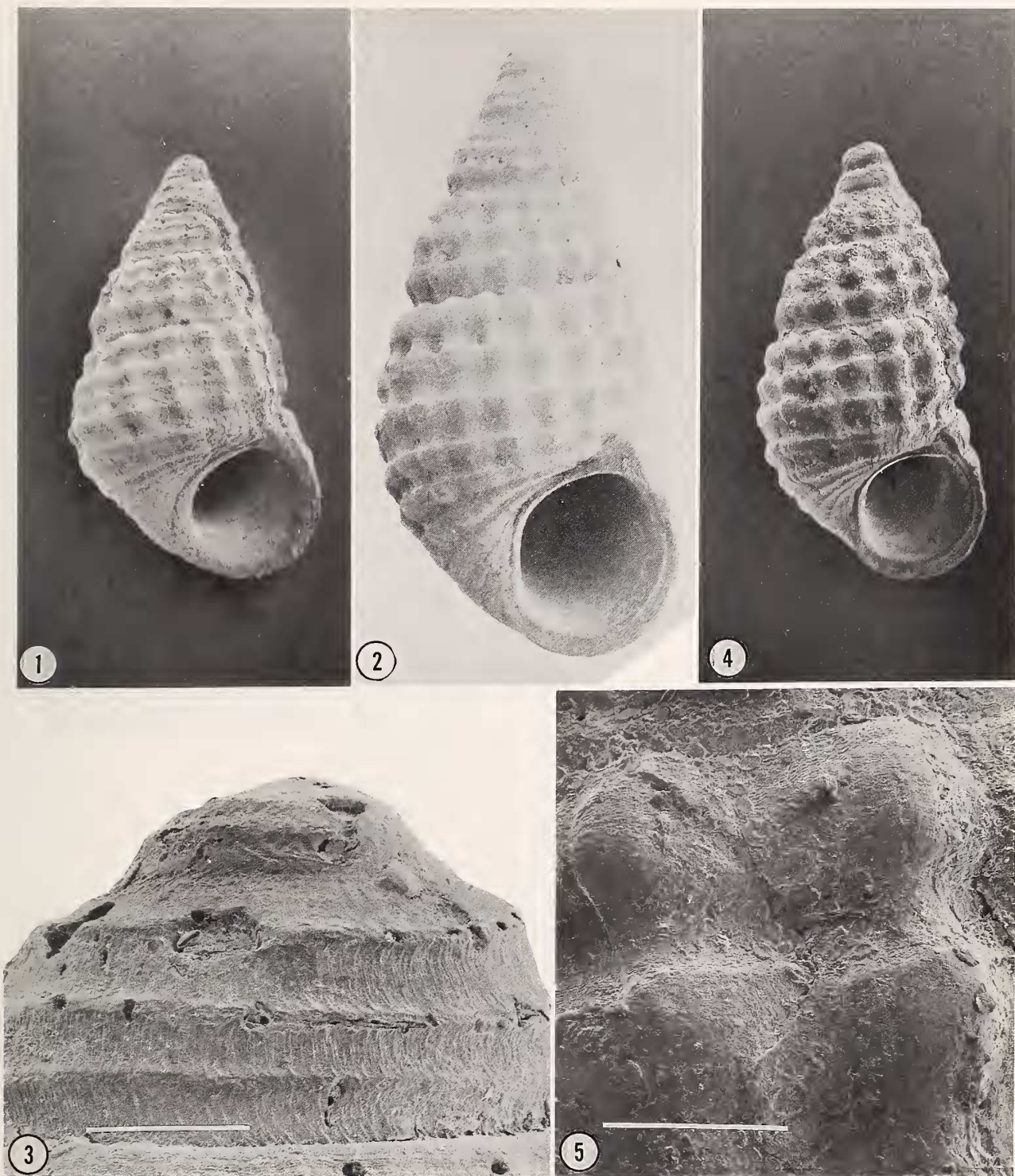
Type species: *Alvania galapagensis* Bartsch, 1911, of Ponder, 1983, not Bartsch, 1911 [= *Lirobarleeia nigrescens*, Bartsch & Rehder, 1939]

*Lirobarleeia nigrescens* (Bartsch & Rehder, 1939)

(Figures 2-11)

*Alvania nigrescens* Bartsch & Rehder, 1939:8, pl. 2, fig. 5.  
*Lirobarleeia galapagensis* (Bartsch): Ponder, 1983:243-244, fig. 12A-D.

**Background:** *Alvania nigrescens* was described and figured from a single specimen by Bartsch & Rehder (1939:8,



Explanation of Figures 1 to 5

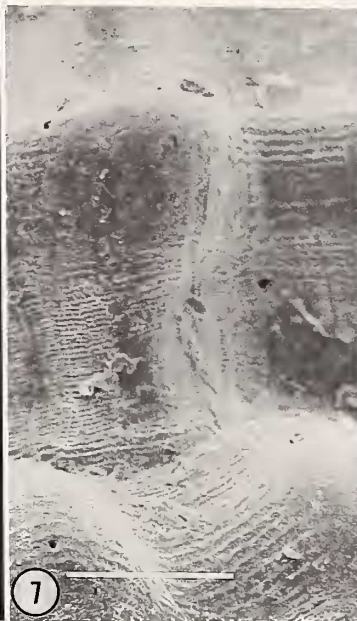
Figure 1. SEM photograph of holotype of *Alvania galapagensis* Bartsch, 1911 (USNM 207590), Length = 3.1 mm.

Figure 2. *Lirobarleeia galapagensis* of Ponder, 1983, specimen from Bahía Academy, Isla Santa Cruz, Islas Galápagos (0°44 5'S, 90°18.5'W) (AMS C.137206, ex LACM 66-120). From Ponder (1983:264, fig. 12A), reprinted with permission of the Australian Museum, Sydney. Length = 3.3 mm.

Figure 3. Protoconch of specimen shown in Figure 2. From Ponder (1983:264, fig. 12D), reprinted with permission of the Australian Museum, Sydney. Scale bar = 100  $\mu$ m.

Figure 4. SEM photograph of holotype of *Alvania nigrescens* Bartsch & Rehder, 1939. Length = 3.1 mm.

Figure 5. Microsculpture of specimen shown in Figure 4. Scale bar = 200  $\mu$ m.



pl. 2, fig. 5). The holotype (USNM 472621) is elongate-conic, chestnut brown, and approximately the same size (length 3.1 mm, diameter 1.5 mm) as *Lirobarleeia galapagensis* of Ponder, 1983. The dead specimen of *A. nigrescens* was collected "in a tide pool" on Old Providence Island, Caribbean Sea (Isla de Providencia, Colombia) by Dr. Waldo L. Schmitt, Curator of the Division of Marine Invertebrates of the United States National Museum, on the Presidential Cruise of 1938. Ponder (1983:244) synonymized *A. nigrescens* with *L. galapagensis* of Ponder, 1983, and stated that "the West Indian locality for this last name is erroneous." I agree with Ponder that *A. nigrescens* is a Galapagan species and not Caribbean. The type lot has a series of labels, all stating the collecting data reported by Bartsch & Rehder (1939:8). However, Waldo Schmitt on the Presidential Cruise of 1938 collected extensively in the Islas Galápagos in June and July of 1938, prior to collecting at Isla de Providencia (6 August 1938), and I believe the locality data of the holotype of *A. nigrescens* was later confused during curation. In over 50 years no additional specimens matching the description of *A. nigrescens* have been found in the Caribbean, although the isolated Isla de Providencia may not have been subsequently collected.

**Species description:** On the basis of examining approximately 800 specimens as well as SEM photographs of shell microstructure, a revised description of the shell of this species is given as follows. Length 3.0–3.5 mm, diameter 1.5–1.8 mm, reddish-brown, elongate-conic, solid. Protoconch of 2–2½ well-rounded whorls with random irregularly shaped pits, having three poorly defined spiral lirations and axial growth lines between spirals. Teleoconch of approximately four whorls, with well-defined suture, both spiral and axial sculpture with spiral cords dominant. Whorls shouldered at summit, 14 strong axial ribs on early whorls, 16 on penultimate, and 18 on body whorl; ribs extending strongly from summit of whorl to suture. Whorls marked by three strong spiral cords, the first occurring at angle of shoulder near summit, the second on middle of whorl and the third immediately above suture; many fine, wavy, spiral lirations paralleling major spiral cords. Posterior spiral cord weak on earliest whorls and

increasing in strength, becoming strong on penultimate whorl. Intersections of axial ribs and spiral cords forming strong tubercles and clathrate sculpture; tubercles sloping anteriorly forming concave surfaces, spaces between tubercles forming deeply impressed squarish pits, occasional fine spiral thread in sutures of whorls. Basal area non-umbilicate, attenuated anteriorly, somewhat concave. Base bounded by strong peripheral cord; a partially noded cord immediately anterior to the peripheral cord and four strong, smooth cords that grow progressively weaker and closer spaced from the periphery to the umbilical region. Rounded aperture with simple peristome; outer lip thickened by external varix; inner lip appressed to base. Posterior spiral cord of body whorl having an inverted V-shaped build-up of material immediately above posterior portion of aperture.

**Distribution:** Islas Galápagos, Ecuador.

**Specimens examined:** In addition to the type lot, I examined approximately 800 specimens from 28 lots. Eight lots were from the K. L. Kaiser collection, two from the AMS, and 18 from the LACM. All specimens were from the Islas Galápagos and were collected from the intertidal to a depth of 101 m. A majority of the shells were collected intertidally. Shells examined were from, or waters nearby, the following islands: Isla Santa María (Florea, Charles), Isla Española (Hood), Isla Seymour, Isla San Salvador (Santiago, James), Isla Santa Cruz (Indefatigable), Isla Bartolomé, Isla Genovesa (Tower), Isla Pinta (Abingdon), Isla Fernandina (Narborough), Isla Isabela (Albemarle), and Isla Baltra (South Seymour).

**Discussion:** *Lirobarleeia nigrescens* is the most common *Lirobarleeia* in the Islas Galápagos but apparently has been misidentified in the past because of its general similarity to *Alvania galapagensis* Bartsch, 1911. *Alvania galapagensis* is a deep-water species that is more pear shaped, having more flattened and widely separated nodes, and less channeled sutures than *L. nigrescens*. The latter is dark reddish-brown but much of the material examined was eroded or sun-bleached, and therefore many of the specimens examined were varying shades of light brown, orange, and yellow; in one lot there were three colorless shells (LACM

#### Explanation of Figures 6 to 11

Figure 6. SEM photograph of *Lirobarleeia nigrescens* (Bartsch & Rehder, 1939) specimen collected by K. L. Kaiser (LACM 148956), at Punta Cormorant, Isla Santa María, Islas Galápagos (1°13'S, 90°26'W). Length = 3.1 mm.

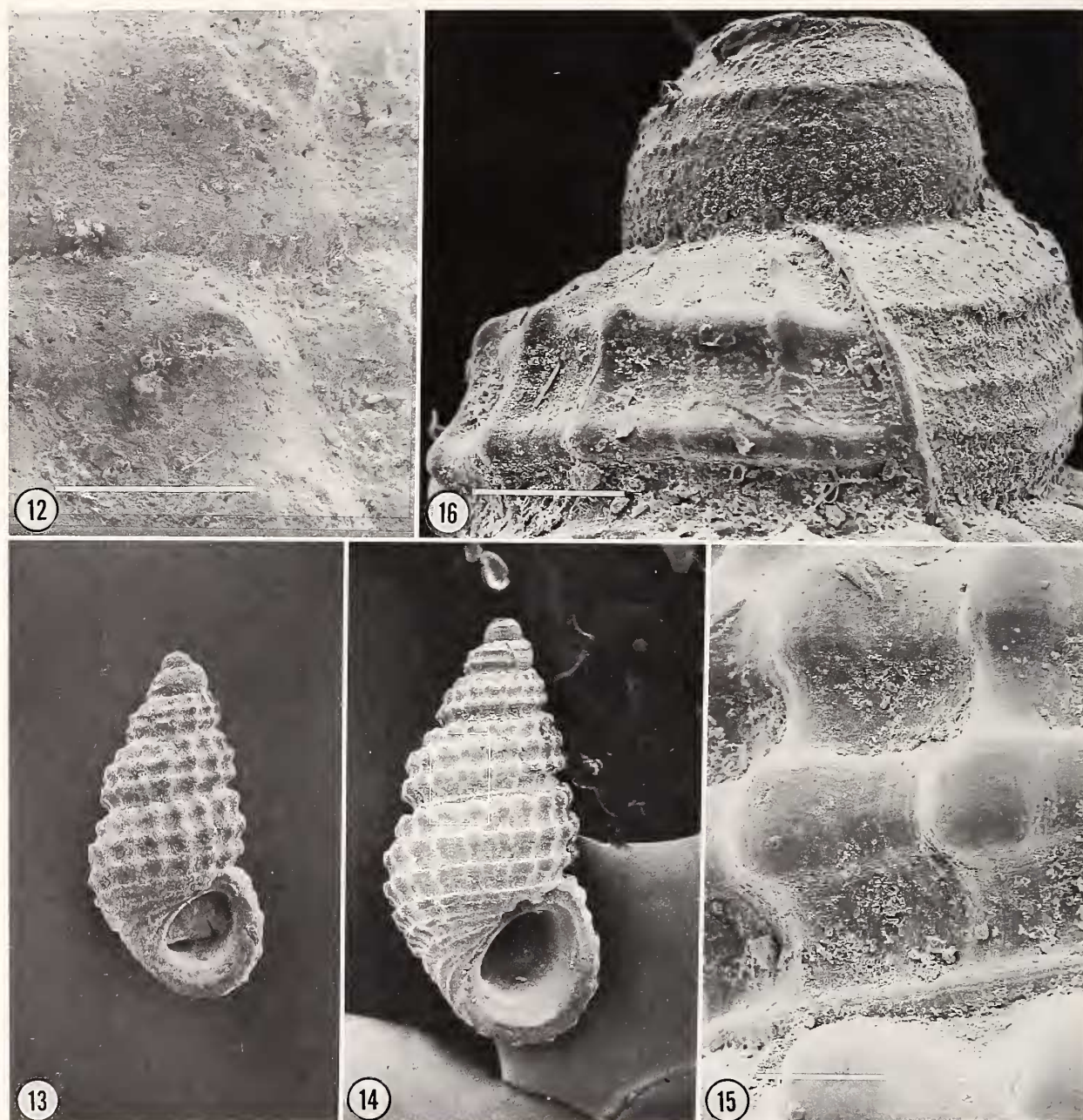
Figure 7. Enlarged detail of sculpture enclosed in rectangular box in Figure 6. Scale bar = 125 µm.

Figure 8. SEM photograph of protoconch of *L. nigrescens* specimen collected by K. L. Kaiser (LACM 148957), at Jimmy's Reef, N side Isla Española, Islas Galápagos (1°21'S, 89°39'W). Scale bar = 200 µm.

Figure 9. SEM photograph of protoconch of *L. nigrescens* specimen shown in Figure 6, collected at Punta Cormorant, Isla Santa María, Islas Galápagos. Scale bar = 100 µm.

Figure 10. SEM photograph of *L. nigrescens* specimen (LACM 66-119) collected between Punta Tomayo and Bahía Academy, Islas Galápagos (0°47.7'S, 90°20.5'W). Length = 3.5 mm.

Figure 11. Microsculpture of specimen shown in Figure 10. Scale bar = 200 µm.



## Explanation of Figures 12 to 16

Figure 12. Microsculpture of holotype of *Alvinia galapagensis* Bartsch, 1911. Scale bar = 200  $\mu$ m.

Figure 13. SEM photograph of holotype of *Alvinia halia* Bartsch, 1911. Length = 2.3 mm.

Figure 14. SEM photograph of *Alvinia halia* (Bartsch, 1911) specimen collected by K. L. Kaiser (LACM 148958), at Devil's

Crown, Isla Santa María, Islas Galápagos (1°12'S, 90°25'W). Length = 2.3 mm.

Figure 15. Enlarged detail of sculpture enclosed in rectangular box in Figure 14. Scale bar = 125  $\mu$ m.

Figure 16. SEM photograph of protoconch of specimen shown in Figure 13. Scale bar = 100  $\mu$ m.

84-47). A large number of the examined specimens appeared to have the protoconchs eroded smooth and rounded as shown in Figure 9 in contrast to the protoconchs with spirals as shown in Figures 3 and 8. Figure 8 is an SEM

photograph of a *L. nigrescens* specimen collected by K. L. Kaiser having a much less eroded protoconch (collected at Jimmy's Reef, N side Isla Española, Islas Galápagos in 17 m, 16 February 1988, among lava rock and coarse sand),

and it shows four spiral cords on the protoconch with the axial growth lines and random pits. A large number of juvenile specimens examined (LACM 84-39) had more-defined, fine spiral sculpture. Many of the adult specimens examined had a beige coating on the protoconch and early teleoconch whorls, and where the coating was eroded or chipped away the protoconch appeared smooth and rounded. In one case, a specimen (LACM 72-196) was observed with spiral sculpture locally eroded, exposing a smooth and rounded underlayer. There is some variation in body sculpture, with occasional specimens having stronger axial ribs spaced farther apart. Many specimens lack a thread in the sutures, and the basal areas have varying degrees of concavity. In some cases the aperture is not quite round, occasionally having a squared look.

*Lirobarleeia nigrescens* is closest in external sculpture to two other Galapagan species: *L. galapagensis* and *Alvinia halia* (Bartsch, 1911).

*Lirobarleeia galapagensis* (Bartsch, 1911)

(Figures 1, 12)

*Alvinia galapagensis* Bartsch, 1911:347–348, pl. 30, fig. 9.  
*Alvinia (Alvinia) galapagensis*: Keen, 1971:368, fig. 196;  
 Finet, 1985:13.  
*Lirobarleeia galapagensis*: Shasky, 1989:9; Finet, 1991:269.

**Remarks:** *Lirobarleeia galapagensis* (Bartsch, 1911) is from deeper water, 1160 m (634 fm), whereas *L. nigrescens* has been found from the intertidal down to 101 m. I considered the possibility that *L. galapagensis* was a deep-water ecophenotype of *L. nigrescens* but rejected it for the following significant differences. The type lot (holotype and two paratypes) of *L. galapagensis* (USNM 207590) are ovate shells, yellow-white, and have a larger diameter for similar length shells than the elongate-conic, dark reddish-brown specimens of *L. nigrescens*. The holotype measurements reported by Bartsch (1911) were length 3.3 mm and diameter 1.9 mm, but recent measurements give a length of 3.1 mm and a diameter of 1.8 mm. The two paratypes are identical in appearance to the holotype, and each has a length of 2.8 mm. The predominant sculpture of *L. galapagensis* is the axial ribs, in contrast to the spiral cords of *L. nigrescens*. In *L. galapagensis* the teleoconch whorls are less shouldered and the sutures not as depressed as in *L. nigrescens*. *Lirobarleeia galapagensis* has a fourth spiral cord, which appears between the middle and anterior spiral cords on the penultimate whorl and continues on the body whorl, whereas *L. nigrescens* has three spiral cords on all whorls. *Lirobarleeia nigrescens* is closer in shell characteristics to another Galapagan species, *Alvinia halia* (Bartsch, 1911), than to *L. galapagensis*. There have been no anatomical studies of *L. galapagensis*, since it is known from the type lot only. Therefore, generic placement for this species remains questionable. Figure 12 is an SEM photograph of the microstructure of the holotype of *L. galapagensis*, and it shows the same spiral striations as in *L. nigrescens*. The protoconchs of the holotype and paratypes

of *L. galapagensis* are too worn to use as indicators for generic placement.

**Distribution:** Islas Galápagos, Ecuador.

**Specimens examined:** Type lot (USNM 207590: holotype plus two paratypes).

RISSOIDAE Gray, 1847

*Alvinia* Monterosato, 1884

Type species: *Alvinia weinkauffi* (Mohrenstern ms) Weinkauff, 1868; subsequent designation Crosse, 1885.

*Alvinia halia* (Bartsch, 1911)

(Figures 13–16)

*Alvinia halia* Bartsch, 1911:354–355, pl. 31, fig. 5.  
*Alvinia (Alvinia) halia*: Keen, 1971:368; Finet, 1985:13.  
*Manzonia (Alvinia) hiala* [sic]: Ponder, 1985:48.  
*Lirobarleeia halia*: Shasky, 1989:9; Finet, 1991:269 (Shasky erroneously cites Ponder [1983] for this change).

**Background:** Many *Alvinia* species appear similar to those of *Lirobarleeia*, both having small shells of similar shape, a duplicated peristome, and clathrate sculpture. Although Ponder (1985:48) placed *Alvinia* as a subgenus of *Manzonia*, his justification for doing so was not strongly argued. The protoconch of *Alvinia* differs significantly from that of *Lirobarleeia* (Figures 3, 16), and there are significant anatomical, opercular, and radular differences. However, in the case of *Alvinia halia*, there have been no anatomical studies. The protoconch and duplicated peristome of *A. halia* are similar to those of *A. weinkauffi* (see Ponder, 1985:151, figs. 102A, B), the type species of *Alvinia*.

**Remarks:** Shells of the type lot (holotype and 15 paratypes) of *Alvinia halia* (USNM 195000) are elongate-conic, white, somewhat eroded, and smaller (holotype: length 2.3 mm, diameter 1.1 mm) than the dark reddish-brown specimens of *Lirobarleeia nigrescens*. Figure 13 is an SEM photograph of the holotype. An SEM photograph of a non-eroded specimen of *A. halia* collected by K. L. Kaiser on the Grupo Victoria Expedition to the Islas Galápagos is shown in Figure 14. The specimens from this lot varied in length from 2.3 to 2.4 mm and had approximate diameters of 1.1 mm. The overall sculpture of *A. halia* is similar to that of *L. nigrescens*, having a protoconch of 1½ whorls and four teleoconch whorls, three spiral cords per whorl, and approximately the same number of axial ribs. However, *A. halia* is smaller, more slender, and has more pronounced and deeper sutures than *L. nigrescens*. In comparing Figures 5 and 15, *A. halia* shows only traces of the fine, wavy, spiral striae (at high magnification) that parallel the major spiral cords in *L. nigrescens*. Figure 16 is an SEM photograph of the protoconch of the specimen of *A. halia* shown in Figure 14. The protoconch of *A. halia* has four spiral cords and is papillose; it lacks the axial growth lines between axial cords and has smaller and fewer random irregular pits than *L. nigrescens*. The first teleo-

conch whorl of *A. halia* is more shouldered and has narrower, stronger axial ribs, which result in sharper, more pronounced tubercles than those of *L. nigrescens*.

**Distribution:** Islas Galápagos, Ecuador.

**Specimens examined:** Type lot (holotype and 15 paratypes), 73 m; Devil's Crown, Isla Santa María (Floreana) (1°12'S, 90°25'W), in 9–12 m, 14 February 1988, 8 specimens, K. L. Kaiser *leg.*; Plaza Norte, Isla Santa Cruz (0°35'S, 90°10'W), in 11 m, 13 February 1988, 17 specimens, K. L. Kaiser *leg.*

### CONCLUSIONS

Ponder's (1983) designated type species for the genus *Lirobarleeia* was erroneously identified as *Alvania galapagensis* Bartsch, 1911, a species different from the one he used for his anatomical and morphological studies. *Lirobarleeia galapagensis* of Ponder, 1983, becomes a synonym of *L. nigrescens* (Bartsch & Rehder, 1939), a species named from a single specimen reportedly collected in the Caribbean. No additional specimens of *L. nigrescens* have been collected in the Caribbean in over 50 years and it is believed that the Islas Galápagos is the true type locality for *L. nigrescens*.

Since Ponder's extensive anatomical studies to support the creation of the genus *Lirobarleeia* were all conducted on specimens of *L. nigrescens* = *L. galapagensis* of Ponder, 1983, it seems appropriate that *L. nigrescens* be specified as the type species of the genus. I will petition the International Commission of Zoological Nomenclature ICZN under provisions of Art. 79A accordingly.

*Alvania galapagensis* Bartsch, 1911, is tentatively placed in *Lirobarleeia* based on external shell characters. No live-collected specimens have ever been found of this deep-water species, so anatomical studies cannot confirm its placement. *Alvania halia* has external sculpture similar to that of *L. nigrescens*, but it is smaller, white, has deeper sutures, and has a distinctly different protoconch.

### ACKNOWLEDGMENTS

I am indebted to Kirstie L. Kaiser for collecting the newly cited material of *Lirobarleeia nigrescens* and *Alvania halia* and making it available for study, to M. G. Harasewych, Alan R. Kabat, and Raye N. Germon of the National

Museum of Natural History, Smithsonian Institution, for loan of the types of *Alvania galapagensis*, *Alvania halia*, and *Alvania nigrescens*, and to Winston F. Ponder of the Australian Museum, Sydney (AMS), for loan of two lots of *Lirobarleeia galapagensis* of Ponder, 1983. The late C. Clifton Coney of the Los Angeles County Museum of Natural History (LACM) took the SEM photographs, and David K. Mulliner is thanked for additional photography work. I am most indebted to James H. McLean (LACM) and Winston F. Ponder (AMS) for their continued encouragement and for reading the manuscript. I thank the San Diego Natural History Museum, Marine Invertebrate Department for use of its library and facilities. Figures 2 and 3 are reprinted from Ponder, 1983:264, with permission of the Australian Museum, Sydney.

### LITERATURE CITED

- BARTSCH, P. 1911. The Recent and fossil mollusks of the genus *Alvania* from the west coast of America. Proceedings of the United States National Museum 39(1863):333–362.
- BARTSCH, P. & H. A. REHDER. 1939. Mollusks collected on the Presidential Cruise of 1938. Smithsonian Miscellaneous Collections 98(10):1–18.
- FINET, Y. 1985. Preliminary faunal list of the marine mollusks of the Galapagos Islands. Institut Royal des Sciences Naturelles de Belgique, Documents de Travail No. 20:1–50.
- FINET, Y. 1991. The marine mollusks of the Galápagos Islands. In: M. James (ed.), Galápagos Marine Invertebrates Taxonomy, Biogeography, and Evolution in Darwin's Islands. Volume 8, Chapter 12:253–280. In: series editors F. G. Stehli & D. S. Jones, Topics in Geobiology. Plenum Press: New York.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE. 1985. International Code of Zoological Nomenclature. 3rd ed. 338 pp.
- KEEN, A. M. 1971. Sea Shells of Tropical West America. 2nd ed. Stanford University Press: Stanford, California. xiv + 1064 pp.
- PONDER, W. F. 1983. Review of the genera of Barleeidae (Mollusca: Gastropoda: Rissoacea). Records of the Australian Museum 35(5, 6):231–281.
- PONDER, W. F. 1985. A review of the genera of the Rissoidae (Mollusca: Mesogastropoda: Rissoacea). Records of the Australian Museum (1984), Supplement 4:1–221.
- SHASKY, D. R. 1989. An update on the mollusks from the Galapagos Islands as listed in "Preliminary Faunal Study of the Marine Mollusks of the Galapagos Islands," by Yves Finet. The Festivus 21(1):7–10.